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FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY
Ms. Donna Searcy
Secretary
Federal Communications Commission
1919 M. Street, N.W., Suite 222
Washington, DC 20554

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Dears Ms. Searcy:

As chairperson of the Regional Planning Committee of Region
47 I submit for your consideration our committee's Public Safety

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Ms. Donna Searcy
Secretary
Federal Communications Commission
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JAN 29 1993

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Dears Ms. Searcy:

As chairperson of the Regional Planning Committee of Region 47, I submit for your consideration our committee's Public Safety Radio Communications Plan for the Commonwealth of Puerto Rico formulated in accordance with FCC Dockets 87-112 and 87-359.

On September 10, 1992, the Region Convenor issued a Public Notice announcing the initial meeting of the Public Safety and Special Emergency Planning Committee for Region 47. Said meeting was held as announced on November 10, 1992 at 1.30 pm at the Puerto Rico Communication Corporation in San Juan, Puerto Rico (see Appendix A). In addition to this notice invitations were sent to the Commonwealth of Puerto Rico's Police Superintendent, Fire Department Superintendent, Secretary Department of Health, Secretary Transportation and Public Works, Director Highway and Roads Department, Courts Administrator, , Director Electric Energy Department, Director Civil Defense, Secretary Department of Education, Director Acueducts Department, Secretary of Natural Resources Department, National Guard of Puerto Rico, Director Municipal Police of the municipalities of Ponce, Guaynabo, Caguas, Mayaguez and San Juan, Director of Major Association and Major of San Juan.

In this initial meeting the Planning Committee was officialy established and the Chairperson was elected with a quorum of 21 participants (see Appendix B). Participants in that meeting represented Public Safety Radio Services, Special Emergency Radio Services and Vendor Community. Vendors participation was encouraged, but they were not allowed to vote. As Chairperson of region 47, I compiled all the inputs from the Regional Planning Committe members and developed the final draft which was approved on the meeting of January 21, 1993.

Respectufully submitted.

Cordially yours,



Eddie Salichs
Chairperson, Region 47
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Hato Rey, PR 00919-5467
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REGION 47 PUBLIC SAFETY
COMMUNICATIONS PLAN
CHECK LIST

- 1- COVER PAGE- IDENTIFIES REGION
- 2- CHAIRPERSON- NAME, ADDRESS, PHONE NUMBER AND SIGNATURE.
[PAGE 34.]
- 3- COMMITTEE MEMBERS- NAMES, ORGANIZATIONAL AFFILIATION, ADDRESS,
PHONE NUMBERS. [PAGE 34]
- 4- SUMMARY OF MAJOR ELEMENTS OF THE PLAN. [SEE TABLE OF CONTENTS]
- 5- GENERAL DESCRIPTION OF HOW SPECTRUM IS ALLOTTED AMONG
USERS. [PAGE 6]
- 6- EXPLANATION OF HOW THE REQUIREMENTS OF ALL ELIGIBLES ARE
CONSIDERED AND MET. [PAGE 3]
- 7- EXPLANATION OF HOW ELIGIBLES ARE PRIOTIZED IN AREAS WHERE NOT
ALL ELIGIBLES MAY RECEIVE LICENSES. [PAGE 33]
- 8- EXPLANATION OF HOW THE PLAN HAS BEEN COORDINATED WITH ADJACENT
REGIONS. [PAGE11]
- 9- DESCRIPTION OF HOW THE PLAN PUT SPECTRUM TO BEST POSSIBLE USE
BY;
 - I. REQUIRING SYSTEM DESIGN WITH MINUM COVERAGE AREAS
[PAGE 8]
 - II. ASSIGNING FREQUENCIES SO THAT MAXIMUM FREQUENCY
REUSE AND OFFSET CHANNEL USE MAY BE MADE. [PAGE11]
 - III. MAKING USE OF TRUNKING. [PAGE16]
 - IV. REQUIRING SMALL ENTITIES WITH MINIMAL REQUIREMENTS
TO JOIN TOGETHER ON A SINGLE SYSTEM WERE POSSIBLE.
[PAGE 16]
- 10- EXPLANATION OF HOW INTEROPERABILITY CHANNELS ARE MANAGED.
[PAGE 14]
- 11- "SLOW GROWTH" LANGUAGE. [PAGE 18]
- 12- DOES THE PLAN REFER TO GIVE -BACK FREQUENCIES? YES, SEE PAGE
NUMBER 10.
- 13- USE OF APCO SORTING PROGRAM. [PAGE 20]
- 14- APPEAL PROCESS. [PAGE 33]

REGION 47 PUBLIC SAFETY
COMMUNICATIONS PLAN
CHECK LIST (continue)

Page 2

- 15- DOES THE PLAN PROVIDES FOR REGIONAL MUTUAL AID CHANNELS, IN ADDITION TO THE FIVE (5) COMMON CHANNELS. NO.
- 16- SIMILAR TO THE GENERIC PLAN DESCRIBE THE FORMATION OF THE COMMITTEE;
1. ADVERTISING- COPY SHOULD BE ATTACHED TO LEGAL NOTICE, LETTERS TO THE INDUSTRY, ETC. [SEE APPENDIX A]
 - II. WHO COULD VOTE? AND WHAT PROCEDURE WAS USED AFTER FIRST MEETING? [PAGE 20]
 - III. HOW WAS THE FINAL PLAN ADOPTED. WAS IT BY MEMBERS ATTENDING A MEETING OR MAIL BALLOT? ANSWER: BY MEMBERS ATTENDING THE MEETING. [SEE PAGE 20] COPY OF ATTENDANCE TO EVERY MEETING ENCLOSED. [SEE APPENDIX A]

PUBLIC SAFETY RADIO

COMMUNICATIONS PLAN

FOR

*** REGION 47 ***

THE COMMONWEALTH OF PUERTO RICO

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1.0 SCOPE

1.1 Introduction

In December of 1983, the United States Congress directed the Federal Communications Commission (FCC) to establish a plan to ensure that the communications needs of state and local public

to occur in public safety and public service communications operations long into the future.

2.0 AUTHORITY

2.1 Regional Planning Committee

The development of the Public-Safety Radio Communications Plan for Region 47, the Commonwealth of Puerto Rico, has followed the requirements of the FCC's Report and Order as issued in the matter of General Docket 87-112.

In accordance with the FCC's Report and Order 87-112, the Associated Public-Safety Communications Officers Inc. (APCO) recommended to the Commission the appointment of a "Convenor" for Puerto Rico Region 47. The Convenor served as the coordinator for the assembly and formation of the planning committee.

Participants in the formation of the Regional Planning Committee represented interested parties from both the Public Safety and Special Emergency Radio Services and Vendor Community. A total of 22 individuals have participated in the development process. The list herein contains the names, organizational affiliations, mailing addresses and phone numbers of all participants in the Regional Planning Committee.

The committee was selected by attendance at the planning meeting. Each member of the Committee representing an eligible licensee under the Public Safety Radio Services and the Special Emergency Radio Services was entitled to one vote in all Committee matters. If more than one member per agency was present only one vote per agency was permitted. Except as may be provided elsewhere in the Plan, the majority of those present at a scheduled meeting constituted a majority for all business.

2.2 Planning Committee Formation

The process of forming the Planning Committee was conducted in the following steps:

1. A presentation concerning the requirements for a regional planning committee was presented and discussed at state organization meeting.

2. Letters of announcement were mailed to each major state agency radio users, as well as to state organizations composed of local government level public safety/public service users.

3. A public notice was placed in a newspaper with state wide distribution, for the first planning committee meeting. This first meeting was held at the Puerto Rico Communications Corp., a public facility on December 10, 1992. (See Appendix A).

4. Committee membership was left open to any person or

agency which may not have been notified or decided to join the committee later.

5. Vendors participation was encouraged, but vendors were not allowed a vote.

2.3 National Interrelationships

The Regional Plan is in conformity with the National Plan. If there is a conflict between the two plans, the National Plan will prevail. It is expected that Regional Plans for other areas of the country may differ from this plan due to the broad differences in circumstances, geography, and population density. By officially sanctioning this plan the Federal Communications Commission agrees to its conformity to the National Plan. Nothing in the Plan is to interfere with the proper functions and duties of the organizations appointed by the FCC for frequency coordination in the Private Land Mobile Radio Services, but rather it provides procedures that are the consensus of the Public Safety Radio Services and Special Emergency Radio Service user agencies in this Region. If there is a perceived conflict then the judgment of the FCC will prevail.

2.4 Federal Interoperability

Interoperability between the Federal, State and Local Governments during both daily and disaster operations will primarily take place on the five common channels identified in the National Plan. Additionally, through the use of S-160 or equivalent agreements, a licensee may permit Federal use of a non-Federal communications system. Such use, on other than the five identified common channels, is to be in full compliance with FCC requirements for government use of non-government frequencies (Title 47 CFR, sec 2.103). It is permissible for a non-Federal government licensee to increase channel requirements to account for 2-10 percent increase in mobile units, dependent on the amount of Federal Government Agencies involvement in its area, provided that written documentation from Federal agencies supports at least that number of increased units.

2.5 Regional Review Committee

Upon approval of this Plan by the Federal Communications Commission, a Region Review Committee will be established for the review of applications which do not fall within the stated guidelines provided for in this plan, or for the settlement of disputes concerning this plan and/or its application.

This committee shall consist of the Local APCO Frequency Advisor for this region, a state agency representative, one representative from the Police, Fire and EMS services, and a minimum representation from other eligibles is also welcome. This committee and its composition will be assured by the Puerto Rico

APCO chapter and other Public Safety organizations. Membership on this committee will be solicited on an annual basis. Since this committee will probably not have regular business, it will be up to the Local APCO Frequency Advisor to notify the committee of problems, conflicts, or when it becomes apparent that spectrum demands will outpace available spectrum. Each member of the committee shall be furnished a copy of this plan upon their appointment or election to the committee.

Plan updates shall be accomplished by this committee. All changes or updates to the plan shall be first agreed upon by this committee and then submitted to the FCC for their review and consideration. When approved all changes shall be added to the plan with the appropriate documentation of approval.

This committee shall meet at least once annually to review the implementation of the plan. This review shall consist of examination of any and all license activity.

3.0 SPECTRUM UTILIZATION

This portion of the Plan provides a basis for proper spectrum utilization. Its purpose is to guide the Local APCO Frequency Advisor and/or the Regional Review Committee in their task of evaluating the implementation of this plan within this Region.

3.1 Region Defined

Region 47 is the Commonwealth of Puerto Rico. This region is the result of definition by the Federal Communications Commission as a result of recommendations made in the National Public Safety Planning Advisory Committee (NPSPAC) plan as submitted and approved and contained in Docket 87-112. For purposes of this plan the Commonwealth of Puerto Rico shall be defined as all the lands and waters contained within the boundaries of the Commonwealth of Puerto Rico.

3.2 Region Profile (Demographic Information)

The purpose of this section is to provide the basis for the assignment of frequencies, and their re-use. Since the frequency allocation formula used is based on population within a municipality, it is necessary to provide this information within this plan. Below is the data used in the determination of frequency allocations.

3.2.1 Commonwealth of Puerto Rico Population And Expected Growth Percentage. (See Exhibit A)

The population of the Commonwealth of Puerto Rico is broken down in 78 municipalities between urban and rural residence. The urban population is some 71.22 percent and the rural 28.78 percent.

3.2.2 Geographical Description

There are 78 municipalities in the Commonwealth of Puerto Rico with a total land mass of 3459 square miles. The largest municipality in land extension is Utuado, with a total of 115 square miles and in population San Juan with 437,745 inhabitants.

As is shown above, the population of the Commonwealth of Puerto Rico is 3,522,037 distributed across the land area contained in the commonwealth. This presents some problems in area coverage for radio systems in that the entire land area of any given jurisdiction must be covered. The population per square mile is somewhat sparse which generally indicates that the concentration of radio users for public safety activities is also sparse. All of these items were taken under consideration in the allocation plan.

3.3 Usage Guidelines

All systems operating within the Region having five or more channels will be required to be trunked. Those systems having four or less channels may be conventional or trunked.

The FCC, in its Report and Order states, "Exceptions will be permitted only when a substantial showing is made that alternative technology would be at least as efficient as trunking or that trunking would not meet operational requirements. Exceptions will not be granted routinely, however, and strong evidence showing why trunking is unacceptable must be presented in support of any request for exception."

Systems of four or less channels operating in the conventional mode who do not meet FCC loading standards will be required to share the frequency on a non-exclusive basis.

Public Safety communications at the state level, as it impacts the Region, will be reviewed by the Committee. State-wide public safety agencies will submit their communications plans for impact approval if they utilize communications systems within the Region and those portions of such systems must be compatible with the Regional Plan.

The next level of communication coverage will be a multiple municipality area. Those systems that are designed to provide area communication coverage must demonstrate their need to require such wide area coverage.

This would apply in a situation such as a city requesting coverage of an entire multiple municipality area. Communication coverage beyond the bounds of a jurisdictional area of concern cannot be tolerated unless it is critical to the protection of life and property. If the 800 MHz trunked radio technology is utilized, the system design must include as many multiple municipality government public safety and public service radio users as can be managed technically.

The multiple municipality agency(ies), depending upon systems loading and the need for multiple svstems within an area. must



to define the level below state-wide. Region communications for public safety and public services purposes must provide only the communications needed within its boundaries.

However, if the total number of radios in service does not reach minimum loading criteria for a trunked system, that municipality must consider utilizing the next higher system level if 800 MHz trunked radio is available in the area. As those higher level systems reach capacity, the smaller system communicators in

achieve the coverage required by this plan.

3.4.3 Determination Of Coverage

There are four variables used in determining the area of coverage of a proposed system. These variables are (1) the required strength of the received signal, (2) antenna height above average terrain (HAAT), (3) the effective radiated power (ERP) of the system, and (4) the type of environment.

Received Signal Strength:

For purposes of this plan, received signal strength shall be the determining factor which defines the actual boundary of a system. The minimum signal level which marks the outer boundary of a system shall be 40 dBu.

Antenna Height:

Shall be the height of the antenna above the average terrain surrounding the tower site.

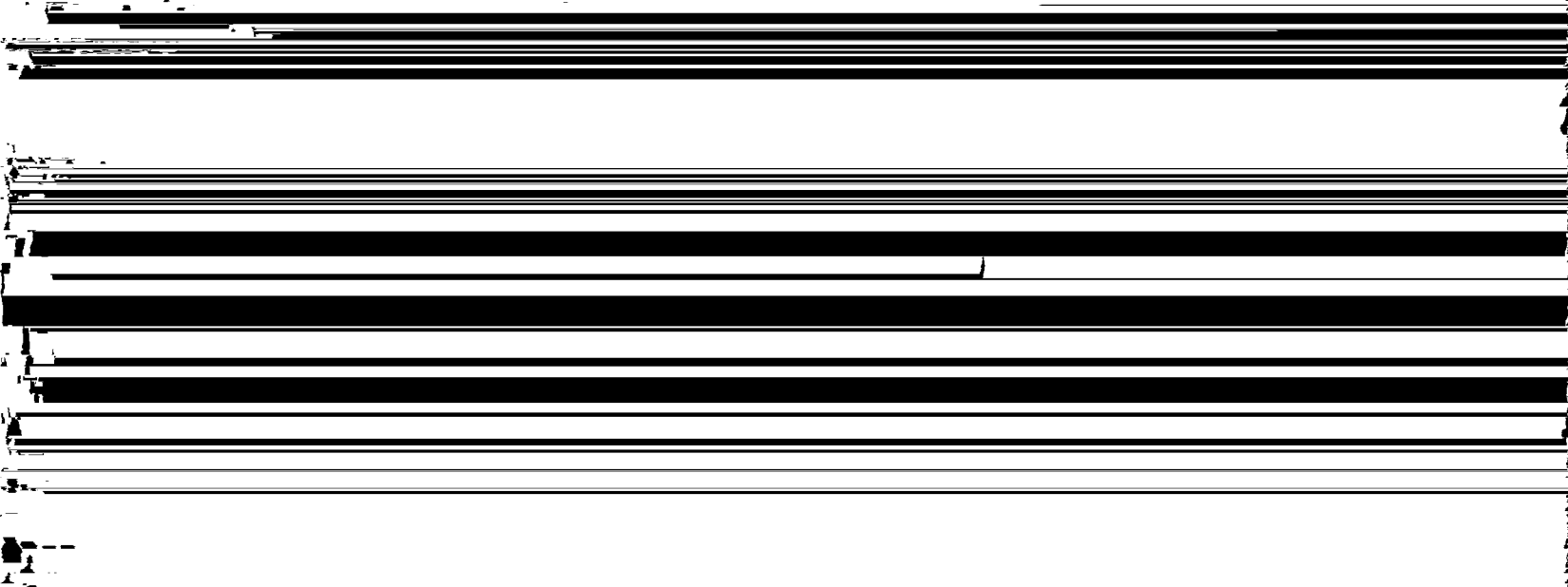
Effective Radiated Power (ERP):

The ERP is the transmitter output power times the net gain of the antenna system. The actual formula is: $ERP (w) = Power(w) \times \text{Antilog}(\text{net gain in dB divided by } 10)$.

Environment Type:

OKUMURA/HATA METHOD - The Okumura method uses four different classifications to describe the average terrain around a transmitter site or area. The classifications are:

1- URBAN; Which is built-up city-crowded with large buildings or closely interspersed with houses and thickley-grown



The Okumura/Hata method is the method resident in the computer packing program to develop this plan. A minimum system shall be permitted without special consideration when it is limited to an HAAT of 100 feet and the transmitter is centrally located within the jurisdiction or jurisdictions participating in a system. In all jurisdictions, regardless of size, a maximum boundary radius of 8 miles shall be allowed provided adequate measures have been taken to assure that interference of existing co-channel and adjacent channel systems will not occur. Preparation of these requirements shall be the responsibility of the applicant. The Federal Communications Commission provides, in part 90.309(a)(4) of the Rules and Regulations, some additional guidance for these calculations.

3.4.4 Annexations And Other Expansions

It is well known that as cities grow, annexations occur. When

Docket 87-112 adopted: November 24, 1987; released: December 18, 1987. The regional planning committee would have the freedom to consider below-800 MHz public safety bands in developing their regional plans, but the licensing of channels in these bands would continue to be conducted through existing frequency coordination procedures.

Frequencies which are to be abandoned by an agency shall not be handed down to another agency within the respective jurisdiction. It is recommended that any jurisdiction wishing to "hand down" frequencies to another agency submit the proper coordination and application forms with the document of release.

3.4.7 Unused Spectrum

Due to the fact that all of the frequency spectrum is not needed at this time, the excess channel pairs will be returned to a reserve pool. These channels may be used for conflict with adjacent Region allocations or may simply remain within this Region until needed. This does not imply that these frequencies are unavailable, only that before they can be utilized within the Region they must be coordinated via the regular APCO coordination process and within the guidelines set forth in this plan. Where possible, the channels designated for a jurisdiction in this plan shall be used.

3.4.8 Adjacent Region Coordination

Coordination with adjacent region shall be an on-going process until all region plans have been finalized. At present, the adjacent region that have been coordinated with and no conflicts have been identified is Region 48, the U.S. Virgin Islands.

As the use of the five National channels is not considered a day-to-day function, the "hard" coordination for the use of these channels is not considered to be necessary or advisable. The use of these channels will always be on a non-interference basis, with on-the-air coordination at the time of use when required. Any user found to be operating in any manner other than this shall be considered to be operating improperly and subject to the existing Federal Communications Commission rules for willful interference with the communications of other users.

3.5 Initial Spectrum Allocation

3.5.1 Frequency Sorting Methodology

The initial spectrum allocation for the Region was determined by a computerized frequency sorting process performed by APCO. The purpose of the computer program which assigns frequencies to

specific eligibles and to pools for future assignments is two-fold:

A) The assignments must result in a high degree of spectrum efficiency, and

B) The assignments must result in a low probability of co-channel and adjacent channel interference.

Since the desired output is a geographic sorting of frequencies, a method of defining geography must be part of the input. A list of the number of channels to be assigned in each geographic area is also required, along with the name of the eligible or pool.

Acceptable interference probabilities are determined for the Region. Frequency assignments are then made using a computer program which satisfies the goals of spectrum efficiency and interference protection. The following narrative describes the factors and process used by the computer program.

3.5.2 Geographic Area

For the purpose of this frequency sort, a geographic area is defined as one or more circles of equal radius. To the degree practical, the circle(s) should include the entire area of the eligible's geopolitical boundary, but not exceed the boundary by more than three (3) miles. Thus, the procedure is to gather maps of sufficient detail, outline the areas to be defined, determine the coordinates and radius of the circles which define each area, and tabulate the data.

3.5.3 Define The Environment

The environment of each system is defined according to the Okumura/Hata method of classifications.

3.5.4 Blocked Channels

In the Region there are five mutual aid channels which must be blocked out to prevent the computer from making assignments on these channels. (Since the mutual aid channels are spaced at 0.5 MHz intervals, other Region-wide systems are spaced at 0.5 MHz and placed adjacent to the mutual aid channels.) This procedure reduces the impact of blocked adjacent channels by virtue of the fact that the channel plan already has protection spacing on each side of the mutual aid channels.)

These Region-wide blocked channels are identified by FCC channel number, tabulated and they become input to the computer program.

3.5.5 Transmitter Combining

The computer program is designed to provide a minimum frequency separation between any two channels assigned to the same

4.0 COMMUNICATIONS REQUIREMENTS

4.1 Common Channel Implementation

The implementation of the International Common Channels must follow the guidelines as set forth by the Federal Communications Commission by the approval of the National Plan. These five common channels are accessible by all levels of government and shall be used in accordance with the provisions of the National Plan. All mobile and portable equipment must be equipped to operate in the "talkaround mode" when required on the International Channels.

The International calling channel (821/866.0125 MHz) shall be implemented as a full mobile relay. Wide area coverage transmitters will be installed where applicable within a system. Large system users (5 channels or more) of 800 MHz shall be required to monitor this channel at all times. The area of coverage for this channel shall be equal to the area covered by the licensed system. This may or may not require the use of satellite receivers within the area to meet this requirement.

The four International Tactical (ITAC) Channels will be assigned State-wide, for use as needed by all eligible licensees. These channels are to be used in accordance with the National Plan and in compliance with the regulations as set forth by the Federal Communications Commission. These channels require no special licensing, only that the users be eligible for licensing on the other Public Safety 800 MHz channels as specified in section 90.617 (a) of the FCC Rules and Regulations.

4.1.1 Areas of Operation

The common channels shall be available for use throughout the Region. No specific assignments were deemed necessary within the Region.

4.1.2 Operation on The Common Channels

Normally, the five interoperable channels are to be used only for activities requiring inter-communications between agencies not sharing any other compatible communications system. Interoperable channels are not to be used by any level agency for routine, daily operations. In major emergency situations, one or more ITAC channels may be assigned by the primary Public Safety Agency within that area of operation. The primary Public Safety agency in each county, if not defined elsewhere in the plan, shall be the County Sheriff's Department or Public Safety Department or the lead agency, which may be any agency licensed to operate in this spectrum, or "on-scene" commander. The primary Public Safety agency shall be the city level Public Safety Department in situations which occur within the corporate limits of said city.

for use according to need during each special situation requiring the use of these channels.

Participants in the interoperable channels include Federal, State, and Local Disaster Management agencies. Police, Fire, and providers of Basic and Advanced Life support services will be the primary using agencies. If radio channels are available, other services provided in the Public Safety Radio Services and the Special Emergency Radio Services may also participate to the extent required to insure the safety of the public. These agencies include the Highway Department, Motor Vehicle Comptroller, Forestry, Wildlife and other special service agencies not normally involved in day-to-day public safety operations.

4.1.3 Operation Procedures

On all Common Channels, plain English and/or Spanish will be used at all times, and the use of unfamiliar terms, phrases, or codes will not be allowed.

4.1.3(I) International Calling Channel (ICALL):

The ICALL channel shall be used to establish contact with other users in a particular Region that can render assistance at an incident. This channel shall not be utilized as an ongoing working channel. Once contact has been established between agencies, an agreed upon ITAC or mutual aid channel shall be used for continued communications.

4.1.3(II) International Tactical Channels (ITAC-1 - ITAC-4):

These frequencies are reserved for use by those agencies involved in inter-agency communications. Incidents requiring multi-agency participation will utilize these frequencies as directed by the control agency assuming responsibility for an incident or area of concern. These frequencies may be subdivided according to function in an incident or by geographical location in response to an incident. It is recommended that the following assignments for ITAC-1 through ITAC-4 be used when possible.

ITAC-1.....	Law Enforcement
ITAC-2	Fire Services
ITAC-3	Emergency Medical Services
ITAC-4	Command and Control

4.1.4 Coded Squelch

All equipment capable of operating on the five (5) common channels shall be equipped with the National Common Tone Squelch of 156.7 Hz. Mobile relays on these channels, if authorized, may use additional tone or digital squelch codes for the purpose of selecting individual mobile relay stations, provided the National

Common Tone Squelch Code is used on the output. If such an arrangement is utilized, provision must also be made for certain centralized, high level sites to be activated by the 156.7 tone to ensure emergency access by transient units.

4.2 Network Operating Methods

Communications systems on ITAC-1 thru ITAC-4 will be implemented by agencies who volunteer on a distributed coordinated basis. Every primary geographic section of the Region is intended to be covered by at least one of the ITAC channels. In many areas the common channels will be utilized on a mobile to mobile talk-around basis. Mobile relays on ITAC-1 thru ITAC-4 will be on a limited coverage design to permit reuse of the channel several times within the Region and in adjacent regions. Since Region 47 will probably not have a large number of stationary ITAC Channel stations, the implementation of mobile relay or repeaters is strongly encouraged. This will fill an "on-scene" requirement for most multi-agency response situations. Adjacent region coordination will be via existing mutual aid coordination procedures with the requesting region establishing the tactical frequency assignment.

4.3 Requirements For Trunking

All systems operating in the Region having five or more channels will be required to be trunked. Those systems having four or less channels may be conventional. It is strongly suggested that any entity licensing three or more repeaters use trunking.

The FCC in its Report and Order states: "Exceptions will be permitted only when a substantial showing is made that alternative technology would be at least as efficient as trunking or that trunking would not meet operational requirements. Exceptions will not be granted routinely. Strong showings as to why trunking is unacceptable must be presented in support of any request for exception."

of trunked systems is encouraged. However, if the total number of radios in service does not reach minimum loading criteria for a trunked system, that user must consider utilizing the next higher system level if 800 MHz trunked radio is available in the area. As systems reach capacity, the smaller system users must consider consolidating their communications systems to formulate one large trunked system.

A requesting applicant for radio communications in the 800 MHz public safety services in the Region will be required to conform to the FCC loading criteria for its proposed system. The provisions of this regional plan must be used as a guide for establishing any new systems. Strict adherence for limiting the area of coverage to the boundaries of the applicant agency's jurisdiction must be observed. Overlap or extended coverage must be minimized, even where systems utilizing 800 MHz trunked radio systems are proposing to intermix systems for cooperative and/or mutual aid purposes.

Antenna heights are to be limited to provide only the necessary coverage for a system. When antenna locations are restricted to only the "high-ground", transmitter outputs and special antenna patterns must be employed to produce only the necessary coverage with the proper amount of ERP. All necessary precautions are to be taken to gain maximum reuse of the limited 800 MHz spectrum.

4.4 Channel Loading Requirements

An agency/jurisdiction requesting a single frequency to replace a frequency currently in use that will be turned back for reassignment will not be required to meet loading requirements in order to obtain the new frequency. However, if the single